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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HO, ALLEN C

ART UNIT PAPER NUMBER

2882

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/022,150

Applicant(s)

FEWSTER ET AL.

Examiner

Allen C. Ho

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 16 January 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3, and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Schuster *et al.* (U. S. Patent No. 6,226,349 B1).

With regard to claim 1, Schuster *et al.* disclosed an x-ray diffractometer comprising: a sample stage (8) for mounting a sample (9), the sample stage being rotatable about an axis (θ); a double pinhole collimator (14, 15) for directing x-ray radiation to a sample on the sample stage; a detector (29) for detecting x-rays diffracted by the sample; and an analyzer crystal (30, 35) arranged between the sample stage and the detector to direct x-rays diffracted by the sample onto the detector, wherein the analyzer crystal and detector are rotatable about an axis (2θ) that is coaxial with the axis of rotation of the sample stage.

With regard to claim 3, Schuster *et al.* disclosed an x-ray diffractometer according to claim 1, wherein a slit (31, 33) is arranged between the sample stage and the detector.

With regard to claim 4, Schuster *et al.* disclosed an x-ray diffractometer according to claim 1, wherein the slit (31, 33) is arranged in front of the detector.

3. Claims 6 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Schuster *et al.* (U. S. Patent No. 6,226,349 B1).

With regard to claim 6, Schuster *et al.* disclosed a method of x-ray diffractometry comprising the steps of: directing x-rays (7) through a double pinhole collimator (14, 15) onto a sample (9) to be measured; diffracting the x-rays diffracted by the sample with an analyzer crystal (30, 35) onto a detector (29); rotating the sample (9) and rotating the analyzer crystal and the detector (29) about coaxial axes (Fig. 8); and measuring the diffracted x-ray intensity as a function of the angle of rotation of the sample and the angle of rotation of the analyzer crystal and detector (inherent, it is the function of a diffractometer).

With regard to claim 9, Schuster *et al.* disclosed a method of x-ray diffractometry according to claim 6, and further comprising the step of: rotating the sample and the analyzer crystal and the detector with rotation speeds substantially in a 1:2 ratio ($\theta:2\theta$).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schuster *et al.* (U. S. Patent No. 6,226,349 B1) as applied to claim 1 above, and further in view of Cullity (1978).

With regard to claim 2, Schuster *et al.* disclosed an x-ray diffractometer, comprising a double pinhole collimator (14, 15) for directing x-ray radiation to the sample on the sample stage.

However, Schuster *et al.* did not teach that the size of the pinhole of the double pinhole collimator nearest the sample stage is adjustable for providing an x-ray spot on the sample of variable size.

Cullity taught that the x-ray spot on the sample is directly proportional to the size of the pinhole of the double pinhole collimator nearest the sample stage (Eq. 5-4).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to make the pinhole nearest the sample stage adjustable, since a person would be motivated provide an x-ray spot that matches with the size of the feature on the sample a person wishes to study, so that the data obtained would be from the feature exclusively without contamination from surrounding areas on the sample.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schuster *et al.* (U. S. Patent No. 6,226,349 B1) as applied to claim 1 above, and further in view of Fujiwara (U. S. Patent No. 5,878,106).

With regard to claim 5, Schuster *et al.* disclosed an x-ray diffractometer, comprising: a sample stage (8) for mounting a sample (9), the sample stage being rotatable about an axis (θ); an analyzer crystal (30, 35) arranged between the sample stage and the detector to direct x-rays diffracted by the sample onto the detector, wherein the analyzer crystal and the detector are rotatable about an axis (20) that is coaxial with the axis of rotation of the sample stage, the

sample stage and the detector and analyzer crystal are rotated with a ratio of rotation angles of substantially 1:2 ($\theta:2\theta$).

However, Schuster *et al.* did not teach that the x-ray diffractometer further comprises a drive for rotating the sample stage and the detector and analyzer crystal.

Fujiwara disclosed an x-ray diffractometer that comprises a drive (10, 17) for rotating the sample stage (5) and the detector (13) with a ratio of rotation angles of substantially 1:2 (22).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a drive for rotating the sample stage and the detector and analyzer crystal, since a person would be motivated to automate the process of data acquisition.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schuster *et al.* (U. S. Patent No. 6,226,349 B1) as applied to claim 6 above, and further in view of Cullity (1978).

With regard to claim 7, Schuster *et al.* disclosed a method of x-ray diffractometry, comprising the step of directing x-rays (7) through a double pinhole collimator (14, 15) onto a sample (9) to be measured.

However, Schuster *et al.* did not teach that the method further including varying the size of at least one pinhole in the double pinhole collimator.

Cullity taught that the x-ray spot on the sample is directly proportional to the size of the pinhole of the double pinhole collimator nearest the sample stage (Eq. 5-4).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to make the pinhole nearest the sample stage adjustable, since a person would be motivated provide an x-ray spot that matches with the size of the feature on the sample

a person wishes to study, so that the data obtained would be from the feature exclusively without contamination from surrounding areas on the sample.

Allowable Subject Matter

8. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

With regard to claim 8, although the prior art discloses a method of x-ray diffractometry according to claim 6, it fails to teach or fairly suggest a method of x-ray diffractometry further comprising the steps of: rotating the analyzer crystal and detector to a predetermined position; rotating the sample while keeping the analyzer crystal and detector in the predetermined position and measuring the x-rays reaching the detector as a function of angle of sample rotation; determining the sample rotation angle at which the measured x-rays are at a peak and rotating the sample to that angle.

Response to Arguments

10. The applicants argue that the diffractometer disclosed by Schuster *et al.* does not rotate the analyzer crystal and the detector about the same axis as the sample stage. The examiner respectfully disagrees. The diffractometer described by Schuster *et al.* is a typical two-circle diffractometer, which comprises a sample stage rotatable about an axis (θ) and a detector stage rotatable about an axis (2θ) coaxial to the sample stage axis. This feature of rotatable sample

stage coupled to a rotatable detector stage is indicated by the notation ($\theta/2\theta$) and is understood by those who are skilled in the art. A description of this type of diffractometer could be found in Cullity (p. 188-196).

11. The applicants argue that the references do not teach adjusting the size of a pinhole. The examiner respectfully disagrees. The very presence of a pinhole collimator suggests that Schuster *et al.* were aware of the importance of the size of the illuminating beam spot on the sample. A person skilled in the art would not employ a beam spot that is much greater than the size of the feature, since the diffracted beam would be contaminated by diffractions due to something other than the feature. Thus, a person skilled in the art would carefully adjust the size of the pinhole to match the size of the feature.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2882


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached at (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Allen C. Ho
Examiner
Art Unit 2882

ACH
June 9, 2003


DAVID V. BRUCE
PRIMARY EXAMINER